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A Study of Histomorphological Patterns of Thyroid Lesions in A Tertiary Care Centre

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ABSTRACT
Thyroid disorders are among the most common endocrine disorders worldwide. Different diagnostic modalities are used for evaluation and diagnosis of thyroid swellings. Final and specific diagnosis requires histopathological examination of lesions which is considered as gold standard. To study the frequency of different patterns of thyroid diseases in patients presenting to a tertiary care center. The present study is a prospective study conducted in the Department of Pathology, Raichur Institute of Medical Sciences, Raichur between July 2019 to June 2022. A total of 80 samples were included in the study. Our study revealed female preponderance of thyroid with predominant age group being 31-40 years. The most common non neoplastic and neo plastic thyroid disorder on histopathological examination at our center was noted to be Multinodular goiter(48.7%) and Follicular adenoma(10.0%). In our setting we have found out that the preponderance of Non-neoplastic lesion is much higher in comparison with Neoplastic lesion. Multinodular goiter was found to be the most common thyroid lesion in this study.

INTRODUCTION

Thyroid disorders are among the most common endocrine disorders worldwide. India too is no exception. It has been estimated that about 42 million people in India suffer from thyroid diseases[1]. Thyroid lesions are challenging tasks to clinicians in judging the nature and thereby, advocating precise and adequate management[2]. Different diagnostic modalities are used for evaluation and diagnosis of thyroid swellings. These include Thyroid Function Tests (TFT), Ultrasonography, Fine needle aspiration cytology (FNAC) and histopathological examination. However clinical assessment, TFT and USG have been poor parameters for assessing thyroid nodules. Final and specific diagnosis requires histopathological examination of lesions which is considered as gold standard. Therefore, the current study tends to analyze different patterns of thyroid lesions by histopathological examination[3].

Lesions of thyroid are common worldwide and are commonly seen in clinical practice. Thyroid diseases are manifested by enlargement of the thyroid gland (goiter), alterations in hormone secretion or both. Depending on various factors, the incidence and prevalence of these thyroid diseases in a given community are variable[4]. Thyroid disorders are four times more in females than in males[5]. The greater part of thyroid lesions consists of non-neoplastic lesions and 5% of the thyroid lesions are neoplastic, whereas remaining of the lesions are due to inflammatory or developmental reasons[6]. The etiology of thyroid diseases is multifactorial. Thyroid cancer in India increased from 2.5-3.5/100,000 women (+37%) and from 1.0-1.3/100,000 men (+27%)[7]. Among thyroid carcinoma, papillary carcinoma is the most common[6]. For most of the thyroid tumours, a diagnosis can be reached by morphologic assessment alone so, the classification of various histomorphological features is important to categorize the lesions into benign and malignant tumours which is done according to World Health Organization classification[8,9]. Histological classification of thyroid tumours is essential for further therapy and prognosis[9]. The present study aims to study the frequency of different patterns of thyroid diseases.

MATERIALS AND METHODS

A prospective observational study was undertaken at Raichur Institute of Medical Sciences, Raichur over a period of 3 years from July 2019 to June 2022. All the thyroidectomy specimens received in Histopathology Laboratory, Department of Pathology, RIMS, Raichur were included in the study. All specimens received were fixed in 10% neutral buffered formalin and embedded in paraffin. The sections were stained with haematoxylin and eosin. The thyroid diseases were classified on histological grounds into neoplastic and non-neoplastic lesions. The thyroid neoplastic lesions were classified according to WHO classification. The study proposal was approved by the Institutional Ethics Committee. Statistical analysis was done using the frequency distribution table in Microsoft Excel Office

RESULTS AND DISCUSSIONS

A total of 80 thyroidectomy specimens were received during the 3 year study period. The specimens received ranged from total thyroidectomies to lobectomies. In the present study, 73 (91.3%) were females and 7 (8.7%) were males. Overall female patients outnumbered male patients with Female: Male ratio of 10:1 (Table 1). In this study, the age of patients ranged from 22-78 years with a mean age of 38.6 years. Highest number of thyroid lesions were seen in the age group 31-40 years (35.0%), followed by third decade where 31.3% of cases were identified (Table 2). Out of the 80 specimens studied, 69 (86.3%) of them were non-neoplastic and 11 (13.7%) were neoplastic (Table 3). The most common non-neoplastic thyroid lesion was Multi nodular goitre (Fig.1) in 39 cases (48.7%). Of these cases, 36 were female (92.3%) and 3 were male (7.7%). 16 cases (20.0%) of Colloid goitre followed by 10 cases (12.5%) of Multi nodular Goitre+Thyroiditis were found. Thyroiditis cases included 3 cases (3.7%) of Hashimoto thyroiditis (Fig.2) and one case (1.3%) of Lymphocytic thyroiditis. Among 11 neoplastic lesions (13.7%) of thyroid, 8 benign neoplasms (10.0%) and 3 cases (3.8%) of malignant neoplasms were reported (Table 4). All benign neoplasms were Follicular Adenoma (8 cases, 10.0%) (Fig.3) with age ranging from 28 years to 45 years with mean age 33.5 years. All malignant neoplasms were Papillary thyroid carcinoma (3 cases, 3.8%) (Fig. 4) youngest case seen in 26 years and eldest case seen in 60 years.

The thyroid gland is unique among endocrine organs in many ways. It is the largest of all endocrine glands and by virtue of its superficial location is the only one amenable to direct physical examination and biopsy. Diseases of the thyroid are of great importance because most are amenable to medical or surgical management[10]. Thyroid diseases are associated with hyperthyroidism, hypothyroidism and mass lesions. From a clinical standpoint, the possibility of neoplastic disease is of major concern in patients who present with thyroid nodules[11]. The occurrence of thyroid diseases varies according to gender, age groups and racial differences[6]. Diseases of the thyroid gland are among the most abundant disorders worldwide. About 300 million people in the world are suffering from thyroid disorders and about 42 million people India reside in India[12]. Neoplastic and non-neoplastic thyroid diseases are common all over the world with

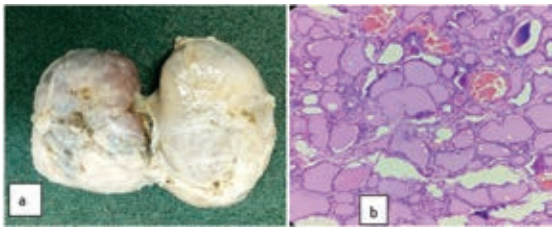

Fig. 1(a-b): Multi nodular goitre (a) Gross: grey white to grey brown capsulated nodule showing variegated appearance(b). Microscopic examination reveals thyroid follicles of varying sizes saperated by areas of fibrosis and haemorrhages

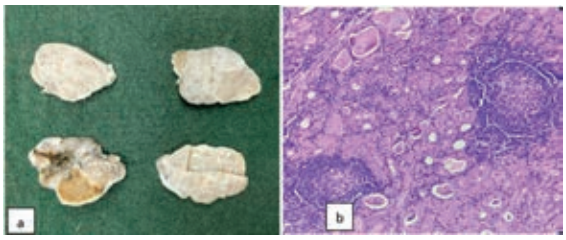

Fig. 2(a-b): Hashimoto thyroiditis (a) Gross: diffuse grey tan thyroid enlargement with area of haemorrhage (b) Microscopic examination reveals extensive lymphocytic infiltrate with lymphoid follicles admixed with atrophic thyroid follicles.

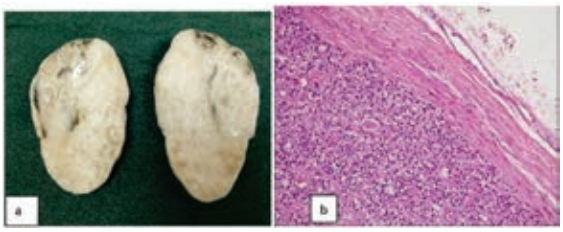

Fig. 3(a-b): Follicular adenoma (a) Gross: single grey white capsulated nodule (b) Microscopic examination reveals closely packed microfollicles with fibrous capsule

varying frequency and incidence depending on iodine deficiency and other environmental factors. Thyroid disorders are more common in women than in men. Historically female preponderance has been found in thyroid diseases owing to the presence of estrogen receptors in the thyroid tissue[4]. Solitary nodules occur more frequently and this incidence increases throughout life. Benign neoplasms outnumber thyroid carcinomas. 80 thyroidectomy specimens were received in this study and the tissues were analyzed histopathologically. The youngest patient in

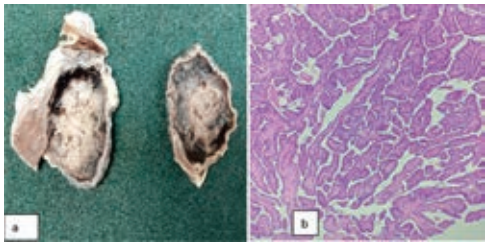

Fig. 4(a-b): Papillary carcinoma (a) Gross: grey white to grey tan showing papillary nodules and projections (b) Microscopic examination reveals papillary projections with fibrovascular core, nuclear overlapping.

Table 1: Gender-wise distribution of thyroid lesions

Gender	No. of cases	Percentage
Male	7	8.7
Female	73	91.3
Total	80	100

Table 2: Age-wise distribution of thyroid lesions

Age group	No. of cases	Percentage
0-10	-	-
11-20	-	-
21-30	25	31.3
31-40	28	35.0
41-50	16	20.0
51-60	8	10.0
61-70	2	2.5
>71	1	1.2

Table 3: Distribution of thyroid lesion according to Neoplastic and Non-neoplastic lesions

Type of thyroid lesion	No. of cases	Percentage
Non neoplastic	69	86.3
Neoplastic	11	13.7
Total	80	100

this study was 22-year-old female with Multi nodular goitre+ Thyroiditis and the oldest patient was a female of 78 years, a case of Multi nodular goitre. As identical to many studies,[12-15] the numbers of female patients were more than the male patients. It is due to the fact that thyroid disorders are female prone owing to the presence of estrogen receptor in the thyroid tissue. In the present study, the most common age group presenting with thyroid disorders was 31-40 (35.0%), followed by third decade (31.3%) which was in comparison to many studies[4,6,12,13,15]. This is probably because, most of malignant and benign lesions are common in these age group. Non-neoplastic lesions contributed to 86.3% and neoplastic lesions constituted 13.7% of the cases which was in comparison to studies conducted by Narkhade *et al*[12] and Fatima *et al*.[15]. Other studies[4,13,16]. Showed variation in the incidence rates of neoplastic and non-neoplastic thyroid lesions in different studies could be due to geographical and and racial factors. Among the non-neoplastic lesions, 48.7% of the specimens were multinodular goiter which is in agreement to other studies[11,12,14,15]. MNG

Table 4: Proportion of various thyroid lesions in males and females

Diagnosis	No. of cases	Percentage	Females	Males
Colloid goitre	16	20.0	13	3
Multinodular goitre	39	48.7	36	3
Multinodular goitre+thyroiditis	10	12.5	10	
Hashimotos thyroiditis	3	3.7	3	
Lymphocytic thyroiditis	1	1.3	1	
Follicular adenoma	8	10.0	8	
Papillary thyroid carcinoma	3	3.8	3	

is the end-stage result of diffuse hyperplastic goiter. Excessive metabolic demands cause excessive enlargement of the thyroid gland and this is why thyroid enlargement is more common in women during puberty and pregnancy. Both these are due to physiological reasons and they eventually develop into an MNG. MNG is a result of continuous stimulation by the TSH released from the anterior pituitary[6]. The next common non-neoplastic lesion in this study was Colloid goiter (20%) in concordance with other studies[4,6,12,15]. Iodine deficiency is the main reason for colloid goiter. The daily iodine requirement is about 100-125 µg. It is treated by iodized salt used for food and also iodine-containing preparations[17]. When the iodine deficiency state continues for a long time, it results in the accumulation of colloid material in the gland and causes colloid goiter. The puberty goiter, pregnancy goiter and colloid goiter if left untreated will change to MNG. Combination of MNG and lymphocytic infiltration was seen in 12.5% cases similar to study done by Joseph *et al*.[14] The next common non-neoplastic lesion was Hashimoto's thyroiditis which occurred in 3.7% of the cases in comparison to other studies[13,14,16]. It is also known as autoimmune thyroiditis where the thyroid gland is gradually self-destroyed. It is a painless goiter and there are no early symptoms[18]. Patients develop hypothyroidism followed by weight gain, fatigue, constipation and depression. Diagnosis is by blood tests for TSH, T4 and antithyroid autoantibodies. It is treated by levothyroxine[19]. Lymphocytic thyroiditis was observed in one case (1.3%) similar to study done by Joseph *et al*.[14].

Benign thyroid tumours are common and although cancers are relatively rare, they represent the most common malignancies of the endocrine system. Thyroid tumours account for approximately 1% of all malignancies in the endocrine system. The WHO published its fourth edition on histological classification of thyroid tumours in 2017. Classification of thyroid tumours is essential for further therapy and prognosis[8]. The possibility of neoplastic disease is of major common in patients who present with thyroid nodules[20]. Among the 13.7% of the neoplastic thyroid lesions in this study, 10% were benign follicular adenoma which is comparable with other studies[6,12,15,16]. Almost all thyroid adenomas are follicular adenomas[20]. It may be inactive or active (toxic adenoma). It may range in diameter from 3-10 cms. Follicular adenomas can be described as cold, warm, or hot depending on their level of function. A thyroid adenoma is differentiated from an MNG in that an adenoma is solitary, encapsulated and arises from a genetic mutation in a single precursor cell.[20] Cautious histopathological examination is necessary to differentiate a follicular adenoma from follicular carcinoma.

Regarding malignant lesions, papillary thyroid carcinoma was seen in 3.8% of the cases as seen in studies done by Narkhade *et al*.[12] and Fatima *et al*.[15] Papillary thyroid carcinoma appears histopathologically as colloid-filled follicles with papillary projections. Psammoma bodies may be present in calcified lesions. Young females are commonly affected in the age group of 20-40 years. Lymph nodes in the lower deep cervical region may be involved frequently. In a study done by Gurbani *et al*.[21] They found females accounted for a higher number of patients with neoplastic thyroid lesions and the prevalence peaked at a younger age. 54.6 % (123) cases were observed of multi nodular goiter cases, forming the most common pathologic lesion. Papillary carcinoma was the most frequent thyroid cancer accounting for most of the thyroid cancers. Padmom *et al*.[22] in their study found that, the non-neoplastic lesions are much more common over the neoplastic lesions and the other is that; the malignant lesions are seen predominating the benign lesions and of the malignant lesions, papillary carcinoma of thyroid is the major constituent. A study done by Sheik *et al*.[23] points to the evolving histopathological spectrum of thyroid diseases with neoplastic lesions showing up as major chunk in thyroidectomy specimens. Females constituted the majority of thyroid lesions and more than half cases were in the age group of 21-40 years. Colloid goitre was the most common non-neoplastic lesion, follicular adenoma, the most common benign tumour and papillary thyroid carcinoma, the most common malignant lesion[24].

CONCLUSION

In our study, thyroid diseases showed definite female predominance, with most of them occurring in an age group of 31-40 years. MNG is the most common disease occurring clinically, radiologically and histopathologically. Follicular adenoma was the most common benign neoplastic disease. Papillary carcinoma is the other less frequently occurring malignant lesions. Although non-invasive techniques like aspiration cytology provide a diagnosis in most, the

ultimate answer often rests with histopathological examination of thyroidectomies. This study emphasizes the need for periodic evaluation of middle-aged and young female patients with MNG for early detection.

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